

**Design of Mobile Tracking Application System for Postgraduate
Office at UUM**

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Universiti Utara Malaysia

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Design of Mobile Tracking Application System for Postgraduate

Office at UUM

**A thesis submitted to the Graduate School in partial fulfillment of the
requirements for the degree Master of Science (Information Technology)**

Universiti Utara Malaysia

By

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بسم الله الرحمن الرحيم قال تعالى:

((وقل اعملوا فسير الله عملكم ورسوله والمؤمنون))

صدق الله العظيم

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ABSTRACT

Mobile devices technology developed rapidly, most of students have mobile devices and they use the communication technologies devices to accomplish their tasks. Students face problems to track their application forms status since they have to call or go to the postgraduate office to check about their application forms status, this study led to the development of Mobile web-based prototype to help the students to submit their application forms from their mobiles and track their application forms by using the mobile application tracking system which reduces the efforts. Postgraduate office can view and change the status of application forms directly by using web tracking system which has been developed. Two systems prototype has been developed and tested successfully. The future work is how to implement those systems online web world and make some enhancements to meet the requirements of technologies.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter describes the background study of mobile and wireless devices technologies. This chapter continues to discuss the problem statement which is related to the WAP Tracking System for UUM Postgraduate Application, which gives the motivation of pursuing to this study. It also discussed research questions and research objectives in Section 1.3 and Section 1.4 respectively. The scope of the study and its significance of the study are explained in the Section 1.5 and Section 1.6 respectively.

Recent advances in hardware technologies as such portable wireless communication networks lead and computers to the emergence of mobile computing systems (Dunham & Helal, 1995). Zheng and Lee (2001) mentioned that the advance of the wireless network and the popularity of the portable devices improved the growth of mobile computing and becomes one of the hottest issues in academic and manufacturing. In other word, technological wireless developments as such 3G wireless application protocol (WAP), mobile phones, General Packet Radio Services (GPRS) and others plays an essential significant role in our life in communicating, entertaining and transacting information (Agrawal and Zeng, 2003). Furthermore, Nadia (2006)

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Refference:

Abdul Hamid @ Hamid bin Haji Hassan (2003). Requirement analysis on wireless network infrastructure in UUM College. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.

Abdualromae Hawor (2004). User's satisfaction of using mobile reservation technology case study: Mobile ticketing reservation system. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.

Agrawal, D.P. & Zeng, Q.-A. (2003), Introduction to wireless and mobile systems, Brooks/Cole Publishing, Pacific Grove, Calif.

Ahmad Hisham, Z. A. (2002). ATM in your pocket: A proposed framework for Mobile Internet banking. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.

Antovski, L. & Gusev, M. (2003). M-Payments. Information Technology Interfaces, 2003.ITI 2003. *Proceedings of the 25th International Conference*, pp,95-100.

Bick, A. (2005). The impact of personal digital assistants on academic achievement.

Retrieved 1 July 2008 from <http://www.millburn.org/science/pda/NatJSHS.pdf>

Bury, S. (2005). Usability testing of an online information literacy tutorial. *Reference Services Review*. Vol. 33 No. 1. pp. 54-65.

Campbell, M. (2007). Identifying success factors of ICT in developing a learning community, Case study Charles Sturt University, Campus-Wide Information Systems Vol. 24 No. 1, pp. 17-26.

Chan, D. & Roddick, J. F. (2003). Context-Sensitive Mobile Database Summarisation. *Twenty-Sixth Australasian Computer Science Conference (ACSC2003)*, Adelaide, Australia.

Cervera, A. (2002). Analysis of J2ME for developing Mobile Payment Systems, Retrieved September 1, 2008 from www.microjaya.com/articles/techtalk/mpayment?content_id=3734.

Colafigli, C., P. Inverardi, and R. Matricciani. (2001). InfoParco: An Experience in Designing an Information System Accessible through WEB and WAP Interfaces.

- Danesh, A. et al. (2001). Geney: Designing a collaborative activity for the palm handheld computer. In *Proceedings of CHI Conference on Human Factors in Computing Systems*, 3(1). Retrieved 31 December 2005 from <http://www.ece.ubc.ca/~elec418/resources/geney.pdf>
- Dunham, M. H. & Helal, A. (S.) (1995). Mobile computing and database: Anything new? *SIGMOD Record*, Vol. 24, No. 4.
- Goto, K. & Kambayashi, Y. (2002). A new passenger support system for public transport using mobile database access. *Proceedings of the 28th Very Large Data Bases (VLDB) Conference, Hong Kong, China*.
- Georgievski, M. & Sharda, N. (2006). Re-engineering the usability-testing process for live multimedia systems. *Journal of Enterprise Information Management*. Vol. 19 No. 2, pp. 223-233.
- Hinze, A. & Buchanan, G. (2006). The challenge of creating cooperating mobile services: Experiences and lessons learned.
- Hinze, A. & Buchanan, G. (2005). Cooperating services in a mobile tourist information system. *Proceedings of the Conference on Cooperative Information Systems (CoopIS)', Agia Napa, Cyprus*.

Hoffer, J. A., George, J. F & Valacich, J. S. (2004). Modern Systems Analysis and Design (2nd Edition). United Kingdom : Addison Wesley Longman.

Kalliola, M. (2005). Mobile payment. Retrieved September 1, 2008 from:
www.tml.hut.fi/Opinnot/T-109.551/2005/reports/Mobile_payments.doc

King, H. J. & Jannik, C. M. (2005). Redesigning for usability Information architecture and usability testing for Georgia Tech Library's website. OCLC Systems & Services. Vol. 21. No. 3. pp. 235-243.

Kumar, V., Parimi, S. and Agrawal, D. P. (2003). WAP: Present and Future *IEEE CS and IEEE Communications Society*. Retrieved September 1, 2008 from:
http://www.sis.pitt.edu/~dtipper/wap_paper.pdf

Lim chee chian, (2004). Multimodal-based mobile application: a development of prototypes for accessing students academic result at UUM. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.

- Lin, H. H. and Wang, Y. S. (2006). An examination of the determinants of customer loyalty in mobile commerce contexts, *Information & Management*, 43, pp.271–282.
- Luchini, K., Quintana, C. and Soloway, E. (2004). Design guidelines for learner-centered handheld tools. In *Proceedings of the SIGCHI conference on Human Factors in Computing Systems*. Pp. 135-142, ACM Press.
- Mohd Yusuf, M. S. (2005). Requirements analysis and proposed model for a wireless network infrastructure in Bukit Kachi student college UUM. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.
- Nadia Diyana, M. (2006). Modeling final driving test system for JPJ using mobile technology. A master project in partial fulfillment of the requirements for the degree of Master of Science (Information Technology), University Utara Malaysia.
- Nor Shahriza Abdul Karim, Siti Hawa Darus & Ramlah Hussin (2006) Mobile phone applications in academic library services: a students' feedback survey, Vol. 23 No. 1, 2006. pp. 35-51 Gombak, Kuala Lumpur, Malaysia.

Porter, L. (2007). Library applications of business usability testing strategies. *Library Hi Tech*. Vol. 25 No. 1. pp. 126-135.

Ramsay, M. and Nielsen, J.. *WAP Usability: 2000 All Over Again*. Nielsen Norman Group. Retrived May 15, 2007 from <http://www.useit.com/alertbox/20001210.html>.

Shaizan, H. & Li, F. (2003) Utilizing IGV Approach In Evaluating the Usability of Web Sites, *Journal of Information and Communication Technology*, 2(2), 25-40

Schaumann, J. (2002). WAP vs i-MODE. Retrieved July 18, 2008, From www.netmeister.org/palm/WAP_iMODE/

Shoniregun A. C. (2004). Classification and Taxonomy of TEISMEs, *Sixth International Conference on Electronic Commerce Edited by: Marijn Janssen, Henk G. Sol, and René W. Wagenaar Copyright ACM 1-58113-930-6/04/10*.

Teng et al. (2007). Mobile G-portal supporting collaborative sharing and learning on geography fieldwork: An empirical study, *JCDL '07*, June 18–23, 2007, Vancouver, British Columbia, Canada.

Turker, M. A. (2000). Electronic delivery of financial services. Garanti technology.

Vahey, P. & Crawford, V. (2002). Palm education pioneers program: final evaluation report. SRI International. Retrieved 28 Novemebr 2005, from www.palmgrants.sri.com/PEP_Final_Report.pdf.

Wireless Application Protocol Forum (1999). Wireless application protocol, wireless markup language specification Version 1.2. Retrieved September 1, 2008 from: <http://www.wapforum.org/what/technical/SPEC-WML-19991104.pdf>

WAP Forum (2002). WAP 2.0 Technical White Paper. Retrieved September 1, 2008 from www.wapforum.org/what/WAPWhite_Paper1.pdf

Williams, L. (2006). Insight: Don't call us, *The Sydney Morning Herald*, p.20.

Zheng, B. & Lee, D, L. (2001). Processing Location Dependent Queries in a Multi cell Wireless Environment, *ACM*.